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Title: 1999/2000 Business and Strategic Plan of the Laboratory Training Program

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Los Alamos
NATIONAL LABORATORY

INTRODUCTORY NOTE

The 1999/2000 Business and Strategic Plan is the third in a series of annual reports for the Laboratory Training Program. It summarizes the Laboratory training plan and the program's FY 1999 accomplishments, assesses training needs at the Laboratory, and outlines the program's FY 2000 strategic and tactical goals.

The Laboratory Training Program is coordinated by the Training Office, which serves as a single point of contact for the Lab's decentralized training services. Line organizations from across the Laboratory deliver training focused on workforce development and Lab operations, with operations training being subdivided into safety- and security-related training and division- or facility-specific training. But although the delivery of training is decentralized, all Laboratory training meets the requirements of performance-based, graded, and systematic training.

Despite the challenge of meeting a growing demand for training in times of tight budgets, the training program made significant progress in FY 1999. Coupling the Employee Development System (EDS) with the Lab's Data Warehouse made it easier to produce training reports. The Virtual Training Center offered a variety of learning and information platforms for training, a major training program around security was initiated, distance learning played a greater role in the training that was delivered, and efforts to exploit the training potential of the World Wide Web were intensified. Web-based training holds the promise of more cost-effective and timely training delivered directly to the workplace.

A key request from our training customers, which is also one of our ongoing tactical goals, is that there be greater access to both instruction and training records on the Web. Training needs assessments continue to document that workers want more self-directed learning options that can be used at the workplace. Both T&D in its Management Leadership Institute and S Division in security training have clearly made Web training a program goal. Managers, supervisors, and workers also need quicker access to training records that document training requirements, progress, and worker authorization status, and such access continues to be a major focus for the Training Office. Development of "super" training plans this past year marked a major advance in documenting worker authorization. Work continues on enhancing the Web-based Virtual Training Center and on enhancing both the usability and versatility of EDS for training records.

Another goal for the training program is to see that training becomes more focused on Laboratory business operations, safe work practices, facility access and authorization, and security issues. To help refocus Lab training, we are increasing our efforts to assess the impact of training on programmatic efforts. All partners in the Laboratory Training Program will be working to evaluate their training effectiveness and in so doing, will review and modify their programs in light of their training contribution to and alignment with the work of the Laboratory.

This Business and Strategic Plan documents that while much has been accomplished in terms of providing the training required to ensure a qualified and safety-conscious workforce, training improvements continue in the areas of on-the-job training (OJT) and advanced training technology. These improvements are defined in our FY 2000 strategic and tactical goals. Our key strategic goal is to become an active partner with Laboratory organizations in attaining

operational excellence. In so doing, we must reappraise how we provide our services and reengineer them to support the business and operational needs of the Laboratory both efficiently and effectively.

Jud Morhart & Carol Ann Mullaney

Acting LANL Training Directors

I. TRAINING OVERVIEW

Training at Los Alamos National Laboratory (LANL) is delivered by line organizations and coordinated through the Training Office, the Lab's program office for training. Recognizing the value of creating one training program for all Lab customers, line organizations and the Training Office are partnering to provide cohesive, cost-effective instruction that supports the Laboratory's mission of delivering science and technology to serve society. Figure 1 shows the programmatic alignment between major training initiatives and the Laboratory's five-year institutional objectives and strategies. LANL training supports the following:

- Science and technology, including Laboratory programs that (1) help nuclear facilities comply with safety, environmental, and operational standards; (2) train the workforce with the skills, knowledge, and resources that will enable them to respond to emerging problems and expand future technical partnerships; and (3) achieve outstanding performance in professional development.
- Workforce excellence (planning and management, professional development, and an enhanced quality of work life) and operational excellence (ES&H, project/construction management, and safeguards and security).
- A flexible, skilled, and diverse workforce to carry out the Laboratory's mission and vision and managers who have the tools needed to improve the quality of work life.

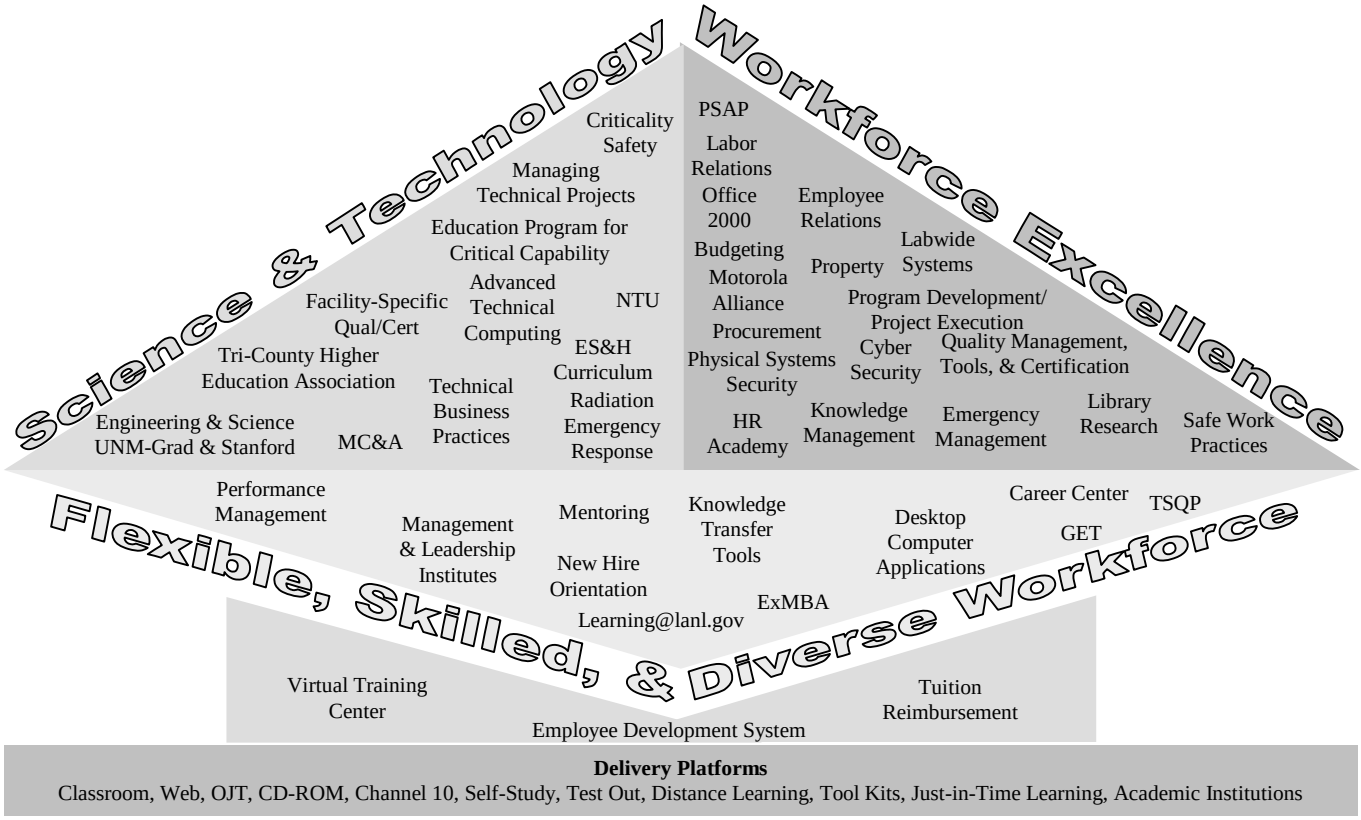

Figure 1. Alignment of the Training Program to the Laboratory's Strategic Objectives

The Laboratory Training Program is designed to support line managers in assessing and meeting the training needs of their organizations and staff. This business and strategic plan addresses major components of the Department of Energy's Corporate Education, Training, and Development Business Plan (December 1999) and describes the training system that underlies the Laboratory Training Program. It also documents the Laboratory's training plan by enumerating the program's accomplishments for the past year, summarizing recent training needs assessment data, and presenting the program's strategic and tactical goals for FY 2000.

Given the importance of customer-focused and institutionally aligned training at the Laboratory and the need to align that training with DOE's Corporate Education, Training, and Development Business Plan, this business and strategic plan will continue to be updated annually to address new DOE training oversight requirements and issues and to assess ongoing accomplishments.

Training Mission

The mission of the Laboratory Training Program is to partner in achieving workforce excellence by improving the performance of both Lab employees and organizations and maintaining a flexible, skilled, and diverse workforce. Unlike many private-sector organizations that provide training to 40%–70% of their workforce, LANL trains all of it's workers annually. We accomplish this mission by delivering training products and services relevant to Lab operations and workforce development. Lab operations' training has two components: (1) Labwide training for safety and security and (2) division- and facility-specific training (Figure 2).

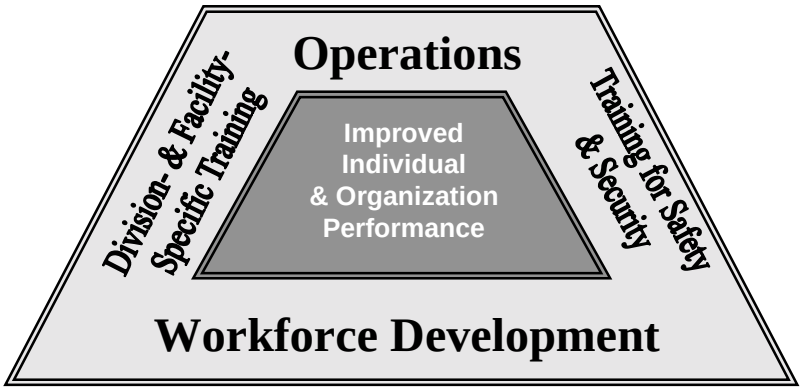

Figure 2. Mission of the Laboratory Training Program

Safety and security training covers topics such as integrated safety management (ISM), health and safety, environmental protection, general employee training, radiation safety, safeguards and security, materials control and accountability, emergency management, computer security, technical surveillance, and personnel security assurance. Two Laboratory divisions—Environment, Safety, and Health (ESH) and Safeguards and Security (S)—supply Labwide training for safety and security. Two subcontractors—Johnson Controls Northern New Mexico (JCNNM) and Protection Technology Los Alamos (PTLA)—also offer and participate in

Laboratory operations training that is specific to their needs and follows LANL training requirements.

Division- and facility-specific training meets the diverse needs of line organizations for facility access, for job-specific qualification and certification, and for career development and mobility. This training is supplied by the Lab organizations that require it. The nuclear facilities at the Laboratory provide most of the Lab's qualification and certification training.

Workforce development training includes management and leadership development, employee development, and performance management training; education programs; new-employee orientation; employee relations training; secretarial training; and business management training. The University of New Mexico at Los Alamos (UNM/LA) provides desktop computer training, and the Computing, Information, and Communications (CIC) Division provides specialized computing and Labwide systems training. The Human Resources (HR) Division is the primary provider of institutional workforce and employee relations training. UNM, the National Technological University (NTU), and other higher-education institutions such as Stanford University provide workforce education programs. The Department of Energy's National Security and Nonproliferation Institute in Albuquerque is another training resource. The Laboratory Training Program structure is shown in Figure 3.

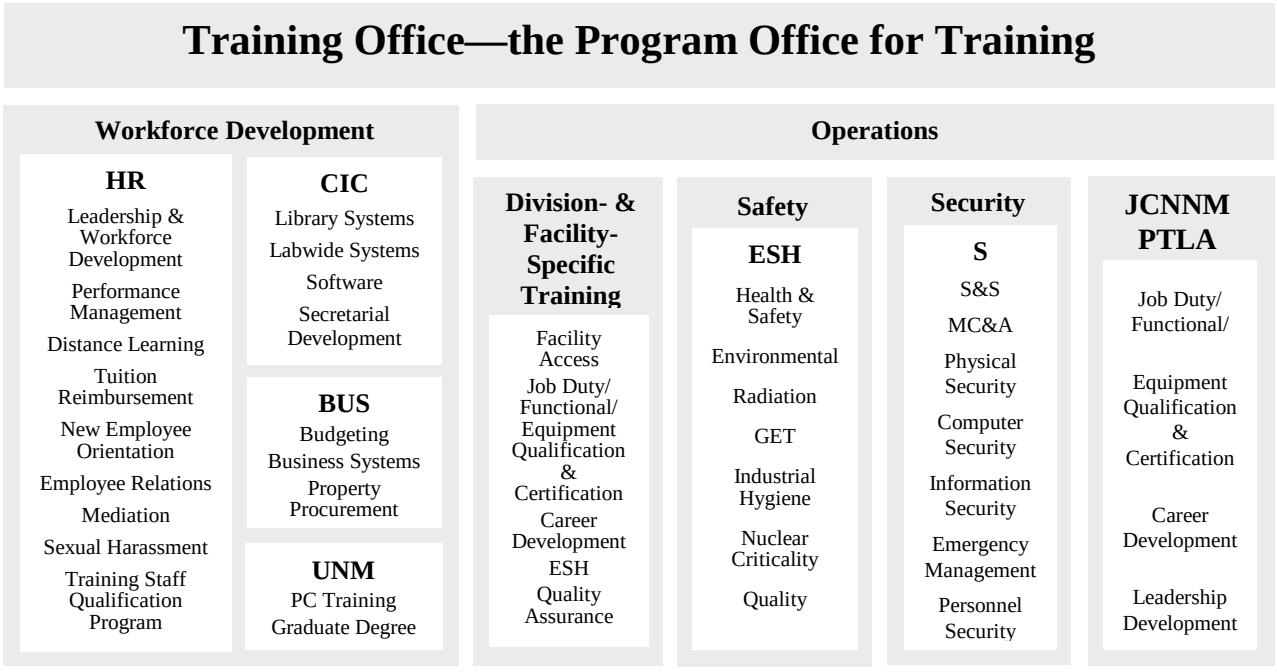

Figure 3. Laboratory Training Program Structure

In addition, the Laboratory works directly with the Tri-County Higher Education Association (THEA) involving Northern New Mexico Community College, UNM/LA, and Santa Fe Community College to augment LANL's undergraduate education and training programs and to create employee pipelines. Current initiatives include the following: a two-year System Administrator degree program in computer science that combines courses with working 20 hours

per week in the Lab's Desktop Group (CIC-2); a four-year, 8,000-hour salaried Machinist Apprentice Program (MAP) at Northern New Mexico Community College; computer training on LANL-approved desktop applications (Word, Excel, PageMaker, etc.) at UNM/LA; the nationally recognized Microsoft Certified Systems Engineer Program at UNM/LA for LANL employees; and the UNM/LA Electro-Mechanical Technology certificate program for technicians that combines on-the-job training and academic course work.

Training Coordination

Training management requires a systems view of how to identify and address the competencies, skills, performance, and behaviors associated with ensuring that the Laboratory has a qualified workforce with the right skills at the right place and at the right time to accomplish its mission. To provide this systems view, the Training Office in HR programmatically manages the Laboratory Training Program. As the Office of Institutional Coordination (OIC) for training, the Training Office synchronizes Laboratory training responses to the Department of Energy (DOE) and University of California (UC), develops Labwide training policy, coordinates and supports Lab training teams, oversees the development and delivery of Labwide training tools, and manages the G&A training budget.

The goal of this office is to provide the "look and feel" of a single, overarching program for the Laboratory's decentralized training services—to be the point of contact for all Labwide training needs. To this end, the office and its Training Director coordinate the institutional teams, Lab response to institutional guidance, institutional training tools, and core distributed-services training staff (see Figure 4). The training Web site gives more information on how we are working to unify Laboratory training services. The site can be accessed through the Training link on the Laboratory's internal home page.

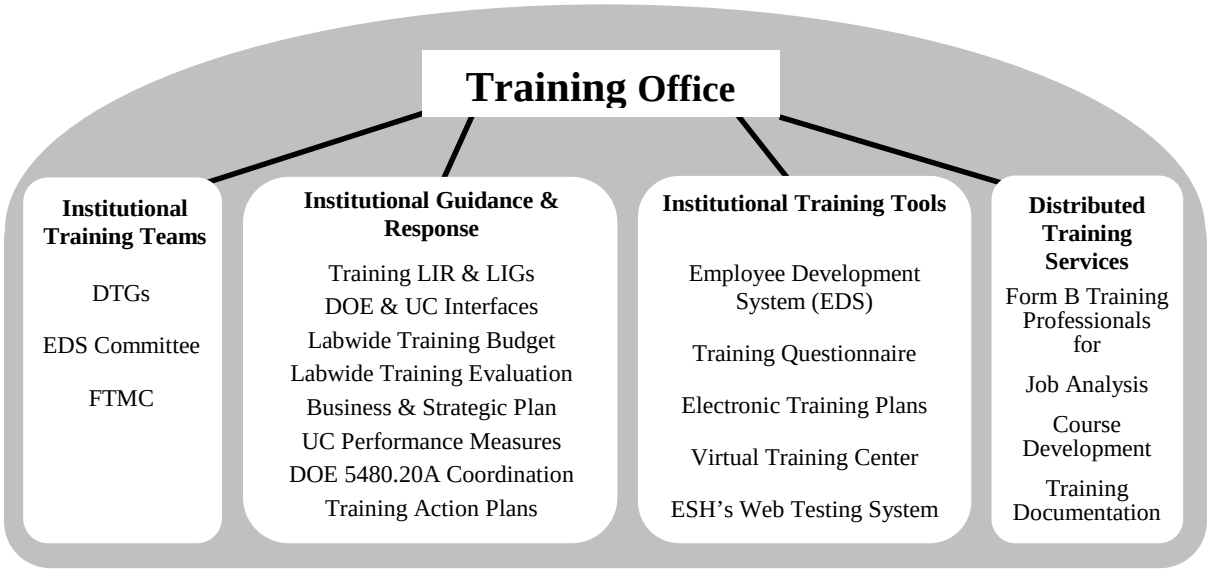

Figure 4. Training Office—Bridging Training Needs at Los Alamos

Institutional Training Teams. Chartered to bring a central focus to the Lab's decentralized training operations, the Training Office sponsors three teams that help coordinate the diverse training products offered at the Laboratory and resolve training issues and conflicts.

- Division Training Generalists (DTGs) are training points of contact and subject matter experts who meet with the Training Director to discuss training directions, report on training accomplishments and issues, and ensure a consistent approach to training programs and initiatives within their separate organizations. They provide feedback to help ensure that the Employee Development System (EDS) addresses the needs of its users and follows all requirements for training records. Their focus is on resource sharing and continuous process improvement.
- The EDS Committee consists of programming and training staff members who meet monthly to discuss the status of system modifications. Their focus is on continuous process and product improvement.
- The Facility Training Managers Committee (FTMC) consists of leaders from groups that provide Labwide training, including Lab subcontractor organizations, and training personnel from the Laboratory's nuclear facilities. Chaired by the Laboratory's Training Director, the committee works to resolve cross-facility training issues and conflicts and to coordinate training decisions.

Institutional Guidance and Response. The Training Office helps define the requirements for Laboratory training, interfaces with the DOE and UC on resolving training issues and sharing training resources, and coordinates a unified training budget. The office also publishes the Laboratory Training Program's annual Business and Strategic Plan and coordinates Labwide efforts to evaluate training in terms of its impact in the workplace.

- Training requirements—An adequately trained and qualified workforce is an essential part of the Lab's Integrated Safety Management (ISM) program. To ensure a safe workforce, we must systematically identify the knowledge, skills, and abilities (KSAs) that workers need in their jobs. A Laboratory Implementation Requirements (LIR) document defines our approach to training. LIR 300.00.04—"Laboratory Training: A Graded and Systematic Approach to a Qualified Workforce" (July 1998)—describes the Lab's training and worker qualification and/or certification requirements. In addition, as the Office of Institutional Coordination, the Training Office published a Laboratory Implementation Guidance (LIG) document, "Laboratory Training: A Graded and Systematic Approach to On-the-Job Training" (LIG 300.00.04, September 1999). OJT is a major component of initial and continuing facility training programs.

  Other LIGs are being drafted. Specifically, the next ones will cover worker qualification and certification, systematic training and test development, and training plans. They are supplemented by two sections in the Laboratory's *Administrative Manual*—Sections 127 and 400—which define training policy, requirements, and processes and by the UC training performance measures (Appendixes F and G). Figure 5 shows the training architecture for ensuring a safe and qualified workforce.

- DOE and UC interfaces—The Training Office responds to the DOE and UC on institutional training issues, audits, reports, and performance measures. The office's Training Director ensures Lab compliance with the training and qualification requirements specified in DOE Orders 5480.20A and 470.1 plus draft Order 350.1. The office manages the Training Implementation Plan (TIP) and coordinates the Training Implementation Matrices (TIMs) of institutional and nuclear facilities that are required by DOE. The Training Director participates in networking groups such as DOE's Partnering Council and Training Resources and Data Exchange (TRADE), Nuclear Facilities Training Certification Program (NFTCP), and the UC Training Managers Committee. Networking opens opportunities for sharing training products and expertise. The Training Director also works with Laboratory groups to help them prepare for internal or external assessments, sharing with them lessons learned and "red flags" related to training as well as the successes of previous Lab assessments. After an audit, the Training Office addresses findings to be resolved by institutional action. Finally, the office tracks progress toward meeting UC performance measures for training, completes self-assessments, and helps facilities prepare for training audits.
- Training budget—To utilize training funds more efficiently, the Training Director coordinates and allocates the G&A training budget in accord with Laboratory priorities. Centralized budget control helps prevent duplication of internal training services, funds new training initiatives, and encourages the use of training products available from other sites within the DOE complex.

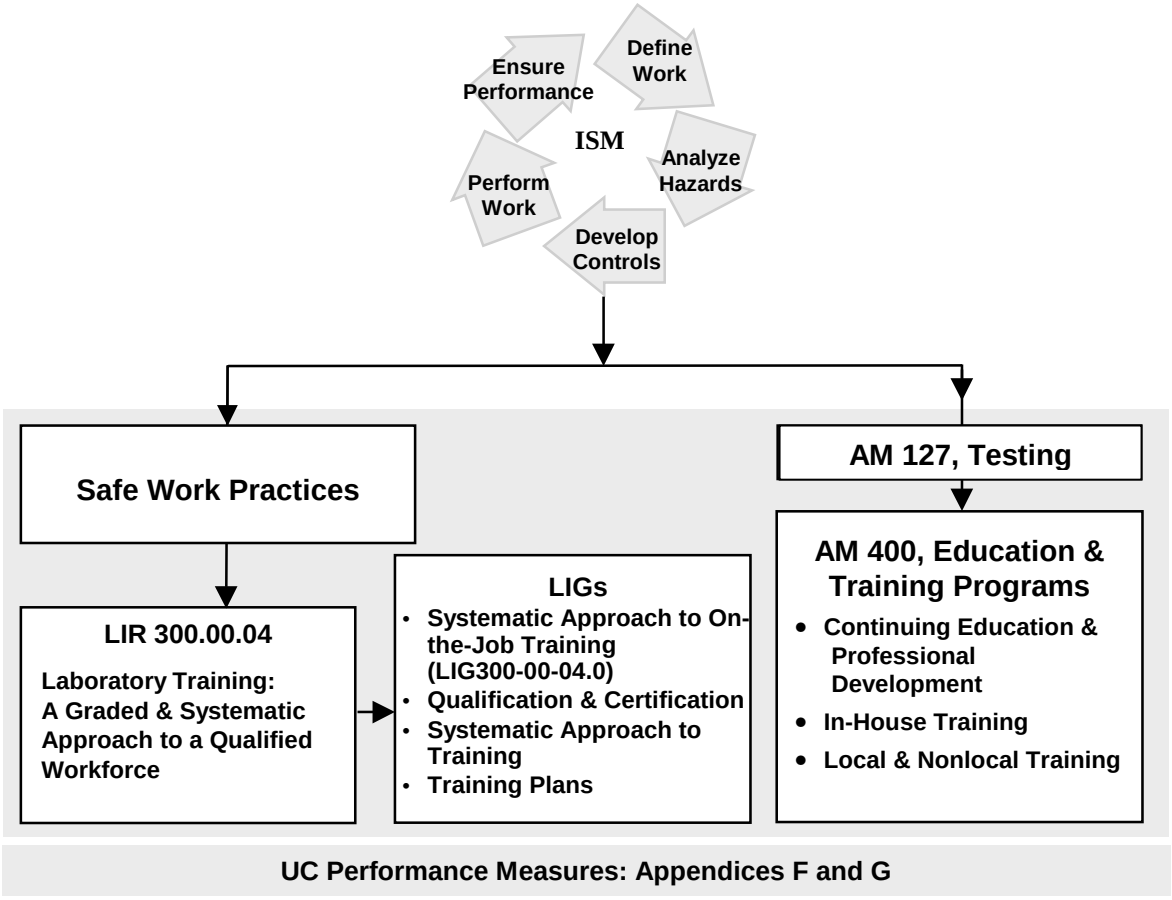

Figure 5. Training Policy Architecture for a Safe and Qualified Workforce.

Institutional Training Tools. A number of tools are available or are being developed to track, prepare, deliver, and evaluate training at the Laboratory.

- EDS is the Laboratory's institutional database of training records for UC, contract, and subcontract personnel. It supplies the training record detail required by regulatory audits and UC reporting requirements and eliminates the need for Laboratory divisions with significant training efforts to maintain separate training record databases. Training data recorded in EDS includes course and employee training histories, training plans, training expiration notifications, and various training reports.
- The LANL Training Questionnaire assists managers, training staff, and other Lab personnel in identifying required training based on job functions, equipment used, or exposure to hazards. The Questionnaire, linked directly to EDS and available on-line, forms the institutional requirements base for developing training plans for "qualified" workers, i.e., workers who must fulfill specific training requirements.
- The Virtual Training Center provides all Lab workers with a one-stop source of information about the training and educational opportunities available to them. This is an integrated site that provides course descriptions, course registrations and drops, access to Web-delivered courses, information about required and discretionary courses from all Laboratory and UNM/LA providers, access for workers and line managers to EDS transcripts, and many other training data resources, tools, and services. All of this information is available at desktops across the Lab.
- ESH-13, the Environment Safety & Health Training Group, has developed a system for delivering validated tests and quizzes on-line via a Web interface using standard browsers. The test and quiz banks are behind the Laboratory firewall, and access to them is restricted to specific facilities/delivery sites as approved by ESH-13. ESH-13's Web Testing System simplifies how the Lab tests employees who must be qualified for their work.

Distributed Services for Training. Training professionals are available for short- or long-term assignments through the Training Office and ESH-13 to develop specific training products such as classroom or Web training, to conduct table-top analyses of job content, to share performance improvement expertise, to help administer training questionnaires and plans, and to assist with EDS data entry.

This past year, the Training Office filled several external training requests that resulted in significant cost savings for DOE and UC. This interface work provided the DOE/UC communities with training resources at a saving of at least $2,500 a day. It also provided the opportunity to build strong networking ties between the Lab, PANTEX, DOE's National Security and Nonproliferation Institute, DOE offices, and Lawrence Livermore National Laboratory.

Labwide Training Organizations and Budget

While the Laboratory Training Program is centrally coordinated by HR's Training Office to provide unified and cost-effective services, the delivery of training is decentralized. Training organizations, often referred to as major sponsoring organizations (MSOs), are responsible for delivering training products and report to their separate line organizations. Figure 6 shows the groups and facilities that offer training at the Laboratory. Five divisions offer Labwide training; a number of divisions, program offices, and facilities offer training specific to their sites.

An on-line Laboratory training directory is part of the Virtual Training Center. The directory lists courses available at the Laboratory and gives specific information on Laboratory training personnel. A Training link on the Laboratory's internal homepage takes Lab staff directly to this information.

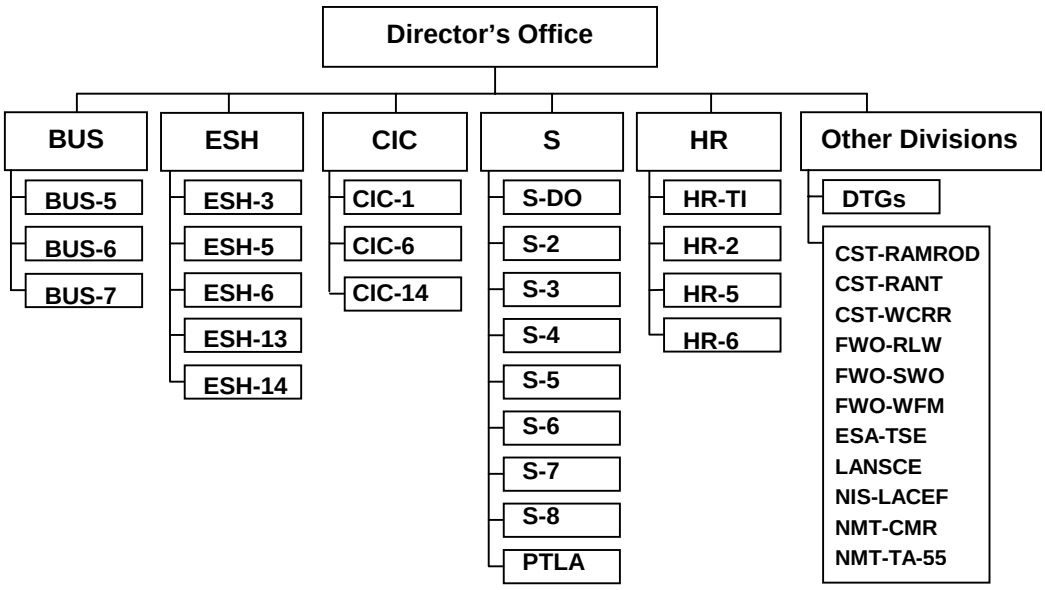

Figure 6. Organizations that Sponsor Labwide and Site-Specific Training

Over the past several years, training programs at Los Alamos and other DOE laboratories have experienced significant budget cuts that have affected how training is managed and delivered (Figure 7). These cuts run contrary to the national trend of a 25% increase in training budgets. Exacerbating the cuts is the fact that they have coincided with a greater demand for training services and the need to keep pace with advances in training technology.

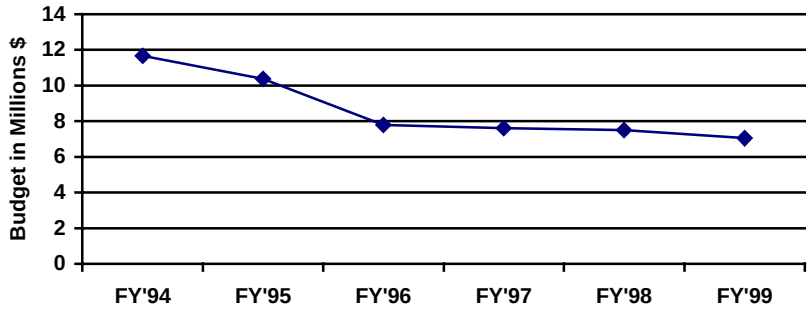

Figure 7. LANL Labwide Training Budget History

In FY 1999, Laboratory indirect (G&A) funding for training supported institutional workforce development and safety/security training programs with a little less than $7.1 million (see Figure 8). Of this sum, $3,357,000 was for workforce development, $3,145,000 for safety and security training, and $550,000 for training program management and systems (e.g., EDS and the Virtual Training Center). In addition to ongoing programs, several new initiatives were funded with this G&A budget: Virtual Training Center tools, safe work practices training for ISM, and EDS enhancements. These budget figures do not include funding for facility-specific training, which is covered by the facilities themselves, or for subcontractor training. In FY 1999, about $9 million was spent on facility-specific training, while Protection Technology Los Alamos (PTLA) spent approximately $1 million on training.

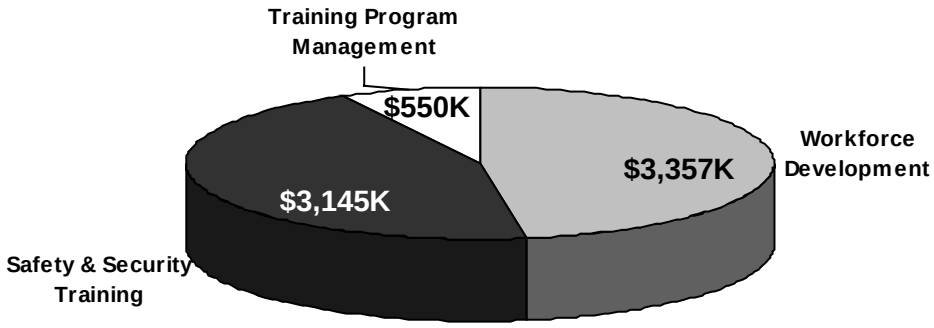

Figure 8. FY 1999 Labwide G&A Training Budget

DOE collects annual data on training costs within the complex to provide a report to Congress. Last year's comparison of our Labwide training budget (including estimates of division- and facility-specific training costs) with training budgets at Lawrence Livermore National Laboratory (LLNL) and Sandia National Laboratories indicated that all three laboratories are quite similar in their training expenditures. A distinguishing difference among the three facilities, however, is the greater number of nuclear facilities at Los Alamos under DOE Order 5480.20A, a factor that radically increases training costs at the facility level.

Laboratory Training Requirement

LANL training is defined as formally planned instruction to achieve the Laboratory's strategic and tactical goals, to meet specific employee needs, and to improve job performance. Training is formalized in a manner commensurate with the demands of the work involved and/or as directed and defined by the agency that oversees the work. Training requirements are defined in LIR 300.00.04, "Laboratory Training: A Graded and Systematic Approach to a Qualified Workforce."

While the delivery of training is decentralized, all Laboratory training meets the standard of a performance-based, graded, and systematic approach to training (Figure 9). A systematic approach means that training is created through a five-step process: analysis, design, development, implementation, and evaluation. A graded approach means that as part of the analysis step, the rigor of training—simple, moderate, or comprehensive—is determined by considering the work and regulatory drivers, the impact and complexity of training, the consequences of training failure, available resources, and most importantly, the work that requires training. That rigor then defines requirements for the other process steps. All five steps must be followed and adequately documented.

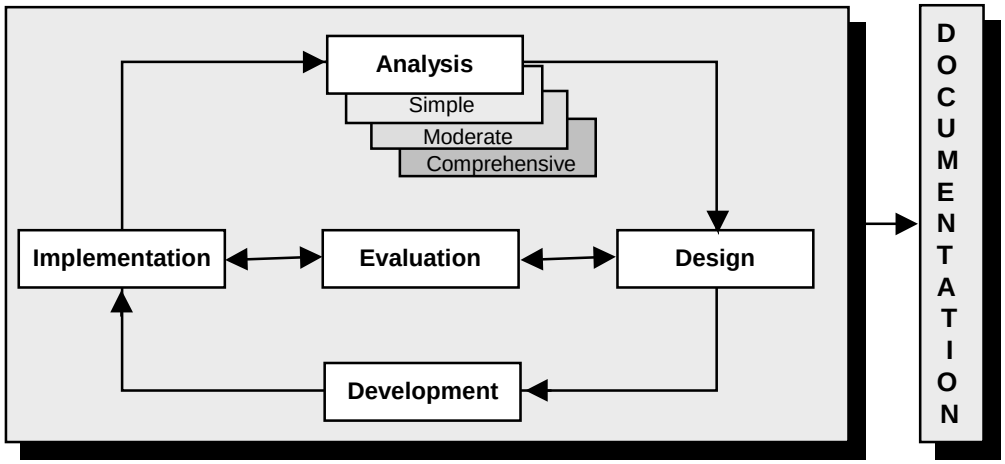

Figure 9. Graded and Systematic Approach to Training

Our graded and systematic approach ensures that quality training is developed that will maintain a qualified workforce. The Laboratory has three levels of worker authorization: worker competency, qualification, and certification. Recent upgrades to our EDS database enable us to document worker authorization.

The Training Office presents a Training Staff Qualification (TSQ) program that, with its continuing training and requalification features, promotes excellence in Laboratory staff who prepare and deliver training. Courses are available to enhance trainers' skills or to complete the formal qualification program required if their instruction leads to the qualification or certification of Laboratory workers. The Training Office partners with LANL technical trainers to deliver several of these courses quarterly. Fifteen sessions of TSQ were offered last year to 173 training staff members. The office has also enrolled trainers in the comprehensive training courses

available through DOE's National Security and Nonproliferation Institute. The Training Office maintains a Web site for obtaining TSQ program information, for taking the TSQ overview course, and for registering for related courses. Qualification and requalification efforts have been streamlined to meet customer needs.

Summary

The Laboratory Training Program encompasses both Labwide training that focuses on enhancing the performance of all Lab employees and organizations and division- or facility-specific training that qualifies and authorizes workers. While training is provided by a variety of divisions, program offices, and facilities, it is coordinated through the Training Office. Combining decentralized delivery with centralized coordination results in customer-focused, cost-effective, and institutionally aligned training that is unified through a common training infrastructure. The Virtual Training Center further unifies training services.

The Laboratory continues to face a number of training challenges. For one, classroom training is no longer accepted as the main delivery method for cognitive, low-risk training because customers want greater flexibility in scheduling their training. Second, as information technology dramatically increases, trainers, trainees, and their managers have higher expectations for instant accessibility to training. Third, no matter how large the funding cuts nor how demanding the new priorities for training, requirements still exist in a nuclear, regulated environment for a qualified workforce. Fourth, the literature shows that "best practices" in industry call for increasing training initiatives during times of change. As our workforce ages and nuclear weapons experts begin to retire, knowledge management related to maintaining a qualified workforce becomes more important. The Training Office and its Laboratory training partners are working to meet these varied challenges.

II. FY 1999 TRAINING PROGRAM ACCOMPLISHMENTS

In its most recent survey, the American Society for Training and Development (ASTD) reports that only 8% of companies surveyed measure or attempt to address how training affects job performance and employee behaviors and that only 2% measure training's impact on business results. However, another survey indicates that more leading-edge companies—and we are recognized by ASTD as leading—are emphasizing this bottom line, that is, measuring how training relates to performance or impacts business results. The Training Program will progress in addressing training effectiveness as we put resources in this area during FY 2000.

The Training Program continues to focus on training that supports the Lab's core capabilities, safety culture needs (including ISM for Managers and Supervisors), new and continuing nuclear training commitments, and labor relations. A major drive this year involved producing effective security immersion training to support a change in the security culture at the Lab. In addition, many Laboratory positions require workers to possess specific knowledge and experience in order to legally perform certain tasks, such as the worker authorization required by the Safe Work Practices initiative. DOE mandates formal qualification and/or certification programs for many positions ranging from fissionable material handlers to technical staff members and managers at nuclear facilities.

Divisions and program offices made great strides in FY 1999 in meeting training compliance and other training or education requirements. For example, CIC Division improved its required training completions from 69% to 94% by establishing new training notification processes for its employees.

This section reports on the training accomplishments of both the Training Office and the various organizations that provide Labwide and division- or facility-specific training. It also discusses cost-saving and -sharing efforts related to training.

The Training Office as the OIC for Training

The Training Office, tasked to create a seamless training program for Lab customers, is responsible for training oversight, centralizes core aspects of the Laboratory Training Program, and coordinates the decentralized delivery of training by a number of divisions, facilities, and groups.

Three of the office's founding "goals" continued to shape training improvements this past year: (1) provide alternatives to classroom training, ensure that training is linked to the job and has a depth of materials, and provide site-based delivery of Labwide training; (2) develop better, quicker, and more accessible systems for record keeping and for tracking safety and required training; and (3) focus training and professional development on meeting organizational and operational goals and on supporting evolving skills and management needs.

This past year, the Training Office worked to improve customer satisfaction with EDS based on the last on-line training survey. Work continued to make EDS more user-friendly and to improve its reporting capabilities. For example, interfacing EDS with the Lab's Data Warehouse provided

wider access to training transcripts, training plans, and management reports. With funding from a Lab training customer, we also extended EDS to provide "super" training plans (Figure 10). Super training plans capture all training requirements at the Lab—institutional, facility-access, and job-specific requirements by nesting them in a single report. These plans enable managers to review all requirements for a given job classification or employee and to check whether those requirements have been met. Thus, super training plans will allow managers to determine more easily if employees are qualified and therefore can be authorized to work. Using a single database to track all training requirements at the Lab also means that when requirements change—for example, when a required course is revised and receives a new number—all training plans that include the requirement can be automatically updated to reflect the change. Super training plans are a major enabling advance in ensuring worker qualification.

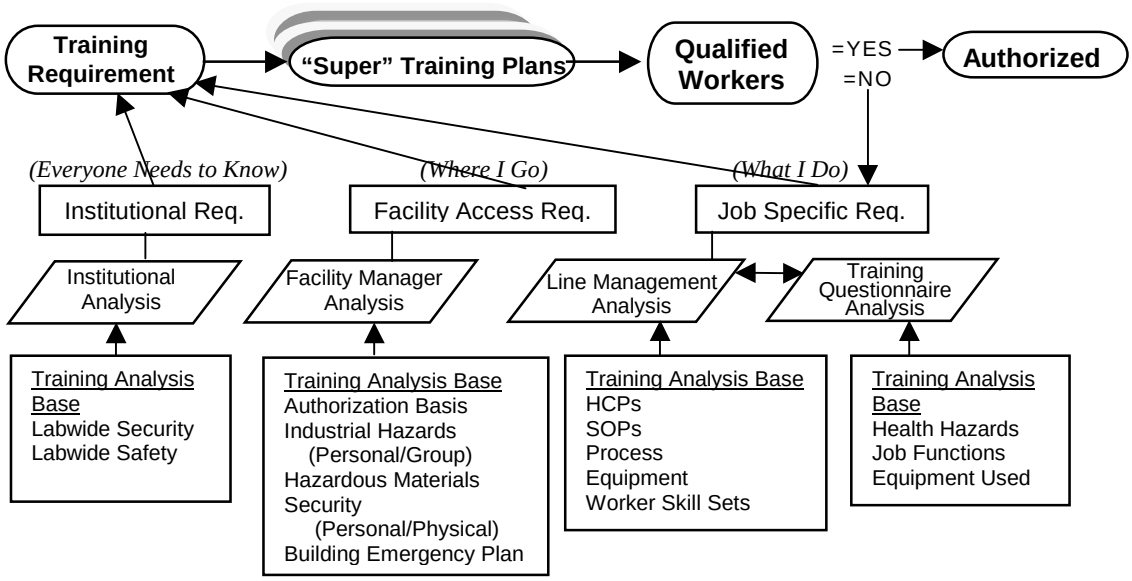

Figure 10. Training Requirements Architecture for a Laboratory Qualified Workforce.

Specific Training Office accomplishments in FY 1999 are listed in the following table as they relate to the office's four areas of responsibility in training coordination (see Figure 4).

Coordination Responsibility	FY 1999 Accomplishments of the Training Office
Institutional Teams	• Conducted meetings with DTGs to review training compliance reports, to demonstrate EDS enhanced reporting capabilities through Data Warehouse, and to discuss the changes to major institutional training programs. Reviewed importance of the completion of the training questionnaire and provided instruction on elements of the training LIR. • Held meetings with EDS users to prioritize upgrades and implement Data Warehouse capabilities.

Coordination Responsibility	FY 1999 Accomplishments of the Training Office
	• Coordinated FTMC meetings to discuss issues such as Web testing, content of the training LIR, agendas of special training meetings, training plan questions, and Lab training/retraining issues. • Assisted in identifying appropriate institutional training for facility workers through use of the LANL Training Questionnaire. • Increased the use of the Virtual Training Center through enhancements to become the sixth most-accessed LANL Web site. An average of 140 workers per day used the Web site for registering or dropping courses, voting for NTU short courses, completing Web-delivered training, and/or receiving EDS training credit.
Institutional Guidance and Response	• Completed or renegotiated milestones to meet DOE Order 5480.20A training commitments at nuclear facilities. • Published LIG 300.00.04 ("Laboratory Training: A Graded and Systematic Approach to OJT") as a resource for managers conducting OJT. • Provided the DOE and UC with Laboratory data on training expenditures. • Continued to work with the Tri-County Higher Education Association (THEA), an alliance with area colleges, to support LANL training and educational needs and the school-to-work initiative. • Completed institutional semiannual self-assessments and DOE reports on training. • Assumed sponsorship of the Training Staff Qualification Program (TSQP) and delivered seven new or updated courses.
Institutional Tools	• Supported the on-line Laboratory Training Questionnaire, which allows workers to identify required training and to secure management approval on-line and enables managers to complete one questionnaire for a work group. • Secured funding for special EDS programming to develop "super" training plans that allow users to fold institutional training plans into facility- and job-specific training plans. • Implemented the Training Requirements Architecture for a Laboratory Qualified Workforce that delineates institutional, facility-access, and job-specific training requirements and demonstrated Data Warehouse training reports and subscription services to senior managers and training staff. • Maintained and improved the Virtual Training Center and prioritized the Center's FY 1999–2000 improvements through a stakeholders' feedback session; implemented several improvements immediately. • Added new features to the Virtual Training Center that allow workers with Token Cards who have completed Web training to immediately deposit their

Coordination Responsibility	FY 1999 Accomplishments of the Training Office
	EDS credit into their transcript files. • Continued to improve EDS's usability through links to reports in the Lab's Data Warehouse.
Distributed Services	• Provided training staff to S Division to conduct job analyses, write procedures, revise lesson plans, and develop Web-based training. • Provided training development, classroom training, and facilitation for NMT. • Provided training management, course analysis/design/development, OJT, Qual Cards, and other services for ESA-TSE. • Provided trainers for the Training Staff Qualification Program. • Partnered with ESA to reinstitute the Machinist Apprenticeship Program (MAP). • Developed training and procedures for JCNNM construction-site workers.

Workforce Development Training

This component of Labwide training is developed and delivered by groups in HR, BUS, and CIC Divisions.

Group	FY 1999 Accomplishments of Workforce Development Training
BUS	• Trained 80 financial professionals in three sessions of Cost Accounting Standards and scheduled two additional sessions. • Developed and implemented an on-line training system that defines critical elements and responsibilities related to LANL-issued safety policy and work requirements and that documents BUS workers' acknowledgement of their understanding of LIRs; completed training plans and related training.
CIC-6	• Delivered 349 computer sessions to over 4,000 employees and 20 Office Skills sessions to 206 employees; created 12 new computer courses for Enterprise Information Applications and Web-authoring tools. • Trained 122 in the use of EDS Data Warehouse reporting. • Piloted a New Student Program for summer students regarding business and scientific computing: 140 students attended the sessions from 16 different divisions and provided very positive feedback. • Upgraded computer classrooms with an NT server, 17 SGI O2s, and 9 Sun Ultra 10s.

Group	FY 1999 Accomplishments of Workforce Development Training
	• Administered CCF/LDCC Escort Training to 542 LANL employees and established a program to administer information security training to cleared LANL employees. • Expanded training and education efforts by 3 FTEs and diversified efforts to support the Supercomputing Challenge and ASCI training.
HR	• Developed and delivered weekly New Hire Orientation, explaining the Laboratory's mission, history, current projects, Labwide systems, and relationship of DOE and UC; 700 new UC employees received this training. • Launched the LANL Leadership Center, including the Management and Leadership Institutes, and received very positive feedback from over 100 participants. • Completed the first cycle of HR Academy training, which involved 50 HR generalists and 9 content areas; the generalists' performance evaluations have showed considerable improvement. • Improved the Lab's Performance Management process by incorporating feedback from users regarding the support tools and training. • Held the first Employee Center Career Conference for over 300 OS/GS workers to enhance their career development opportunities and provide skills development. • Completed the distribution and analysis of the annual Checkpoint and Upward Appraisal Surveys, providing reports to more than 400 managers. • Introduced Just-in-Time Learning (JITL) technology. • Processed 690 UC employees' requests for tuition reimbursements covering 2,418 courses; tuition reimbursements totaled $1,061,573. • Provided 44 NTU courses to 1,231 students and used Web voting for choosing which courses would be offered. • Completed 23 "Sexual Harassment" presentations for 750 workers and taught "Essentials of Supervision" to 90 managers.

Safety and Security Training

As part of Labwide operations training, safety and security training is offered by ESH and S Divisions. Two subcontractors—JCNNM and PTLA—also reported progress in training related to safety and security.

Group	FY 1999 Accomplishments of Safety and Security Training
ESH	• Completed the Web Testing System that simplifies how the Lab tests employees who must meet stringent qualifications in order to perform work. Secure tests for specific programs are now available via the Web at designated sites throughout the Laboratory. Results are sent directly to EDS. Also made self-study quizzes available on the Web, thus saving time and giving immediate feedback. • Developed and delivered a Safe Work Practices course for minimal-risk work and for workers authorized to perform work related to R&D. • Developed a LogOut/TagOut briefing for the new LogOut/TagOut LIR. • Developed and delivered new classes for Radiation Safety Training (Sealed Source) and for firefighters (Emergency Responder Radiological Training). • Developed and implemented changes to the electrical training plans to include more relevant R&D worker training. • Converted all training self-studies to PDF files available on the Web. • Made other technological changes for on-line registration, the use of badge scanners in large classes, and listening equipment for the hearing impaired. • Deployed health and safety trainers as requested by Laboratory customers. • Assisted industrial hygienists and safety professionals with recertification through new courses and continuing educational units (CEUs) at UNM/LA.
S	• Developed an interactive emergency management and response (EM&R) drill to accompany the Introduction to Incident Command course; the new drill allows trainees to practice the course's cognitive content in a realistic scenario. • Coordinated with several ESH groups to complete Phase I EM&R training and provide the Phase II Emergency Responder Radiation Training for the Los Alamos Fire Department. • Delivered a new, very creative EM&R course called "Letter and Package Bombs Briefing," which covers suspicious packages and shows how creative terrorists can be. Completed the Lab's Annual EM&R Exercise. • Provided training support for the Lab's Security Stand-Down for more than 3,000 employees and the Security Immersion for over 10,000 employees. • Changed the Physical Inventory project for the upcoming Office of Security Education (OSE) inspection from a procedure format to Web-based training for the Nuclear Materials Control and Accountability Safeguards. • Helped reduce Q/L-cleared badging time by providing an on-line (off-site, if necessary) Comprehensive Security Refresher Briefing.

Group	FY 1999 Accomplishments of Safety and Security Training
	• In response to a Tri-Lab Info-Sec finding that was issued as a result of this spring's Security Stand-Down, developed a Web-based "Authorized Derivative Classifier—Part I" course that will ensure that all ADC candidates have a basic understanding of classification. • Created an "indirect MASS user" Web-based course for nuclear material handlers who don't need specialized hands-on training for materials accountability safeguards systems (MASS). • Trained over 10,000 employees in Technical Surveillance Counter Measures (TSCM) to satisfy a DOE/AL finding.
JCNNM	• Developed 5 new courses and updated 5 existing courses; delivered and coordinated 352 class sessions to 9,155 trainees for a total of 13,773 contact hours in ten months. • Developed and implemented a process for worker qualification for all JCNNM workers. • Increased training plan compliance to 90% of critical training plans and 80% of other negotiated training plans.
PTLA	• Tested PTLA officers during the DOE/AL Security Survey, the DOE/HG Security Evaluation, and during routine performance testing, training, and qualifications, with the result that 98% of the knowledge and performance tests were passed on the first attempt. PTLA received satisfactory ratings in this area. • Reviewed and updated all protective force job-task analyses and programs of instruction to ensure that PTLA is on the leading edge of DOE protective force training. • Completed PTLA's safest year for training with the fewest workdays lost as a result of injuries/accidents during training.

Division- and Facility-Specific Training

Nuclear facilities that must comply with DOE Order 5480.20A have the most visible training program commitments, with approximately 900 milestones addressed. The Laboratory has an integrated Training Implementation Plan (TIP) and supporting Training Implementation Matrices (TIMs) that cover the following:

- E-ET's Radioassay and Nondestructive Testing (RANT), Waste Characterization, Reduction, and Repackaging (WCRR), and Radioactive Materials Research, Operations, and Development (RAMROD) facilities and its Transuranic Waste Characterization/Certification Project (TWCP),
- FWO's Radioactive Liquid Waste (RLW) and Solid Waste Operations (SWO) facilities,

- Engineering Sciences & Applications–Tritium Science & Engineering (ESA-TSE) facility,
- Los Alamos Neutron Science Center (LANSCE),
- NIS's Los Alamos Critical Experiments Facility (LACEF), and
- NMT's TA-55 plutonium and Chemistry and Metallurgy Research (CMR) facilities.

Related training accomplishments are summarized in the following table.

Division or Facility	FY 1999 Accomplishments of Division- and Facility-Specific Training
E-ET (RANT, WCRR, & RAMROD)	• Designed, implemented, and successfully defended the training program for the RAMROD facility. Continued to meet the training and worker qualification expectations of LANL, DOE/LAAO, and New Mexico Environment Department stakeholders.
FWO (SWO & RLW)	• Introduced a computer-based training program for visitors. • Completed a training database that inventories tasks, identifies qualified personnel, and provides detailed financial management information. • Completed a formal OJT program for all nuclear job functions in Area G. • Overhauled and improved the RLW training program.
ESA-TSE	• Updated training materials for new weapons engineers.
LACEF	• Completed a major revision of facility training plans and issued an umbrella training plan (FMU 74 Training Plan and Procedure) that incorporates the certified positions—LACEF Operators, Certified Fissionable Material Handlers, and Certified Radiographers—to clarify requirements for personnel who must be authorized to perform work; also conducted LACEF Operator Training. • Generated a method for each LACEF operator to document and report his/her operating proficiency each quarter. • Improved the Fissionable Material Handlers Certification by separating it from the Access Team Training. Workers will be qualified by passing written and oral examinations to verify that they can manipulate fissionable material.
LANSCE	• Upgraded CBT lab to accommodate additional training functions, including enhanced proctoring and testing capabilities for ESH-13 Labwide safety courses. • Revised Limited Access Area CBT into modules for more-efficient training. • Revised 5480.20A Training Implementation Matrix to reflect changes for 1L Target Facility operation.

Division or Facility	FY 1999 Accomplishments of Division- and Facility-Specific Training
TA-55 & CMR	• Revised facility-specific training for CMR. • Implemented a field approach to requalification training.
MST	• In preparation for opening the Beryllium Facility in FY 2000, developed a facility-specific training program that includes Web-based training, a series of lectures, and OJT that addresses general facility procedures.

Cost-Saving and -Sharing Efforts

Today's rapid pace of technological change requires that workplace learning occur on a just-in-time basis when and where it's needed to create more flexible and responsive learning and performance solutions. Response from Lab customers has been very positive to the delivery of training through printed materials such as ESH's self-study modules and other means that allow workers to train at their workplace. Since 1995, the Training Program has moved as much training as possible to self-study and test-out options.

The Training Program pursued several cost-saving measures in FY 1999: Web-based delivery of training, video-conferencing training, and inter-laboratory course sharing. A year ago, the Security Division converted 70% of its training to the Web. This past year, the division converted another 10% of its courses to Web formats. Web conversion has reduced the time employees spend on mandatory security training and has eliminated the time lost in traveling to such training. Like other organizations, when possible, we have also turned to outside providers rather than enlarge our training staff to provide new training options—for example, through the THEA alliance, Northern New Mexico Community College has supplied needed education and training.

The Training Office participates in the DOE Cost Cutting Forum, an on-line means of checking throughout the complex for existing training before beginning a new training project, with the objectives of saving development costs and preventing duplication of effort. Our training alliances with three national laboratories (Livermore, Sandia, and Oak Ridge) and with DOE's National Security and Nonproliferation Institute promise additional cost savings. Such savings will accrue as travel-for-training outlays are reduced. Reducing travel for training is timely given DOE's recent restrictions on travel expenditures.

While the second annual All-Hands Training Day focused on knowledge management, its goal was to "share information and materials and ultimately save training dollars." This event showcased individual group, division, and facility training initiatives, including successful training tools, materials, and applications of training technology that could be utilized by others. Approximately 100 staff members involved in training also took advantage of the opportunity to learn from a national expert, Dr. Bodkins, about the national trend of moving training into the area of knowledge management.

We have seen other training efforts (such as the new initiatives on safe work practices and workplace ergonomics) show ultimate cost savings due to fewer reportable workplace incidents. We also expect to track data that will document the cost savings that result from making more knowledge-based instruction available on the Web. In addition, we are looking for ways to capture less tangible training benefits, such as the contribution of our security immersion training to the recent successful audit of Lab security. We also hope to capture training assets such as technical expertise, tacit knowledge, and lessons learned.

Summary

According to a recent ASTD report, growing competition and increased technological advances are the two primary factors that drive changes in training as work becomes more technically complex and demanding. Other factors also drove training changes at LANL during FY 1999:

- Focusing on customer needs.
- Developing and delivering the training needed to satisfy workplace safety and security initiatives without increased funding.
- Meeting managers' and employees' needs for training and tools in support of the Lab's new performance management system.
- Meeting proposed DOE training requirements that focus on adequately tracking training data, eliminating duplication of training initiatives within DOE, and reducing travel for training.
- Completing large projects like DARHT and WIPP that required qualification of workers.

Special mention should also be made of (1) the vast training accomplished by ESH in classroom training to meet Laboratory safety initiative commitments and routine ESH training, (2) the variety of computer training provided by CIC, with close to 300 courses delivered to meet the needs of computer users, and (3) the tremendous training documentation completed during the Lab's security immersion activities.

The accomplishments summarized in this section show that despite training challenges, LANL has not made the mistake of adopting short-term, quick-fix training strategies to meet the training needs of Lab workers. On the contrary, Labwide training programs delivered a greater variety of training to more customers, with courses being delivered via distance learning at a record level. Nuclear facilities and other Lab organizations implemented new qualification and certification programs, and many traditional classroom courses were converted to other delivery methods. Many organizations delivered knowledge-based and low-risk training more efficiently on the Web. By providing the Harvard Mentor program on-line and a Just-in Time Learning (JITL) CD-ROM on performance management, the T&D group enabled managers to enhance their management skills. Finally, the second annual All-Hands Training Day brought institutional and facility training staff together in a meeting with both a learning and sharing agenda.

A recent article about strategic goals for training focused on the need for training systems to respond to and thrive on change, to be decentralized and yet responsive to unpredictable problems, and to show measurable organizational contributions. The accomplishments singled

out in this section validate the Training Office's ability to deal with change, to be responsive to institutional crises, and to manage a decentralized training organization through a small centralized office that focuses on coordination, assessment/corrective action, and resource management. By responding to major Labwide initiatives, such as safety and security immersion training, the Training Program helped the Laboratory meet its strategic objectives. Perhaps equally important, the program moved strongly to deliver excellent customer service. We recognize that both soliciting and responding to customer opinion have a strong statistical correlation with being a successful training organization.

III. TRAINING ASSESSMENT DATA AND ANALYSIS

Evaluation, the last step in a systematic approach to training, analyzes assessment data to track progress, understand training needs and problems, and project their impact on the organization. This section provides assessment data drawn from a variety of external and internal training reviews.

DOE and industry-wide benchmarking data help us assess our training activities and costs relative to those of comparable organizations. For the second year, we joined 540 other corporate participants in the ASTD Benchmarking Forum to establish training trends and expenditures and to assess training's impact on employee performance. The Training Office uses such annual comparisons to ensure that Lab training activities are in line with other DOE training programs and with industry-wide standards.

DOE Training Reviews and Assessments

The Laboratory annually submits reports on the status of training that relates to DOE Order 5480.20A. The nuclear facilities were assessed during the FY 1999 ESH assessment without any findings. One observation helped us focus on reorganizing some facility training.

As a part of HR's performance assessment, DOE and UC evaluated HR training efforts related to implementation of the Lab's new performance management system. A major thrust to improve the quality of performance appraisals at the Lab was through training. This year's completion rate and quality of performance appraisals resulted in HR receiving the Outstanding gradient for this performance measure. Another measure evaluated the success of the HR/T&D Management and Leadership Institutes founded this past year and resulted in another Outstanding score.

FY 2000 will bring more scrutiny of training with the implementation of DOE Order 350.1, which prescribes performance measures to cover DOE concerns related to training cost savings and cost accountability.

Benchmarking Data

One way to evaluate our training program is to compare it with similar training programs within the DOE complex and with industry averages for training. For the latter comparison, we focus on the training done in high-performance and highly technical (or leading-edge) companies.

DOE Benchmarking Data. Although training costs are tracked differently from one institution to another within the DOE complex, comparisons between six sites—Brookhaven, Livermore, Sandia, Oak Ridge, Savannah River, and Los Alamos—continue to show that our training expenditures are midrange. Best estimates indicate the Laboratory spent between $1,400 and $1,600 per worker on training, comparable to what many high-tech companies in industry spend.

National Benchmarking Data. We also evaluate Laboratory training by comparing it with industry-wide trends. Training expenditure calculated as a percentage of payroll has long been a

valuable benchmark. *Training* magazine's Industry Report 1999 provided the following training statistics:

- 69% of training budgets fund staff salaries (trainers and administrative support).
- More organizations are offering more equipment/operational and safety training.
- There has not been an increase in training outsourcing.
- $62.5 billion was budgeted for training in 1999—an increase of 5%.
- The two greatest increases in training expenditures over the last five years are an 80% increase in hardware and technology expenditures and a 49% increase in expenditures for seminars and conferences.
- Most training dollars fund training for managers and professional staff.
- A third of corporations' major training investment goes into computer or information technology training.
- 90% of all training is still delivered in the classroom, but 19% of large companies deliver training by computer and 13% cite other options such as on-the-job training and self-study.

Laboratory training is comparable to the first three statistics. Otherwise the Lab does not follow national trends: funding has not increased, we haven't invested greatly in technology, and the largest training expenditures are not for managers. Unlike the Laboratory, when corporate America talks training, it typically means computer skills, interpersonal skills, or managerial development. By contrast, Laboratory training must cover mandatory and qualification training and, to a lesser degree, generic skills development.

As one of 55 government agencies that participated in the ASTD's 1998 Survey, LANL received a Comparison Data Report of our training figures versus government agency averages and the top 10% of federal agencies. The ASTD report indicates that while industries spent about 2.25% of their payroll on training, the top 10% of federal agencies spent as high as 6.1%; we spent 2.8%. Training expenditures for the top 10% federal agencies were more than double those of the Laboratory.

The ASTD benchmarking data also indicate that an evolutionary change is taking place in how training is delivered, even though classroom instruction remains the primary delivery vehicle (82% for government organizations). There is growing emphasis on combining the best aspects of both traditional and alternative training approaches. The top 10% of all benchmarking participants who use new learning technologies delivered an average of 36% of training with them. While the government average in the survey for the use of new training technologies was only 9%, we estimate that Lab usage is more than double this figure.

The Lab's increasing use of Web-based training is in line with trends for high-tech companies. For example, Boeing reports that not only has on-line learning become a cost-effective solution

to the many challenges it faces, but such training has also improved the dissemination of critical shop-floor skills and knowledge, which has, in turn, increased productivity and reduced defect rates. At Hewlett Packard Co., some 5,000 employees and field engineers in North America and Europe keep abreast of fast-changing products and procedures via a Web-based training and testing program. AT&T claims that through the use of Web training, it has brought new customer service representatives up to speed more effectively and quickly.

New Efforts to Identify the Effectiveness of Training Programs

A long-term project to find better ways to track training effectiveness began this past year with a number of related efforts. We asked division managers which institutional training services needed to be upgraded to authorize workers to perform specific tasks. We started to develop survey tools to collect data about training effectiveness. Managers' use of Management WalkAround Guidance Cards on Training should also help monitor the effectiveness of training on job performance. We also began to analyze the effectiveness of OJT at the Lab's nuclear facilities. Finally, we started collecting data on whether our institutional services and tools (EDS, training completion status reports, electronic training plans, the training plan questionnaire, and the Virtual Training Center) are meeting training needs and functioning as designed.

The Training Office will focus on gathering baseline data on the extent to which managers are using existing training systems, such as "super" training plans, to ensure a qualified workforce and are using individual development plans to develop a more flexible workforce.

Recently we completed an assessment of OJT in various Laboratory divisions to close out an action plan. It became evident, however, that mentoring and OJT are perceived as synonymous in many research areas. While this perception runs counter to the DOE's requirements for formal OJT, which we observe in the qualification programs at nuclear facilities, pure research areas seem to thrive on such day-to-day mentoring. The Laboratory's major concern is that there be consistency in the development and evaluation of formal OJT where formal OJT is needed. Line management needs to support additional work by the Lab's facility and distributed training staff to improve OJT development through assistance in writing and reviewing OJT documents and through more formal training on the documentation of OJT in EDS.

DOE Feedback on Training across the DOE Complex

As part of its emphasis on communicating lessons learned, DOE releases data on training weaknesses observed repeatedly at DOE sites. Among the recurring weaknesses cited are a lack of management support for training and a lack of funding to keep training materials current with facility changes. The DOE has also noted a lack of interaction between line and training managers, inadequate use of training expertise, and lack of personal accountability for training results.

Some of these training issues arise at LANL. Laboratory training managers report that training priorities must compete with other management priorities. And while facilities are trying to be more timely in updating their training programs, more resources must be devoted to this activity.

However, the Laboratory has worked diligently to see that training development involves SMEs and that performance evaluations meet high standards.

After a recent DOE assessment, Laboratory trainers addressed the lack of a consistent continuing training program. Trainers agreed that changes in procedures and lessons learned are components of continuing training. Therefore, the Training Office also tracks DOE lessons learned in training and discusses them at monthly meetings so that trainers can incorporate them in their continuing training. Such lessons are incorporated when appropriate in all training materials developed by ESH-13 and S Division in their Labwide training programs. The lessons are used both to illustrate key training objectives and as standalone modules to reinforce specific training messages. Lessons learned are shared on a continuing basis through networking activities.

Internal Training Assessments

The Laboratory conducts a self-assessment program that examines management systems and includes a training element. Quarterly training reports are also issued to managers on progress toward completing critical metrics for training under HR performance measures. The preparation and analysis involved in both of these efforts help identify specific training issues and document progress on major training initiatives. Significant progress has been made toward improving training completion statistics.

Self-Assessment of Management Systems. This assessment has raised several issues related to training funding. To begin with, the Labwide training budget has not kept pace with inflation, salary increases, or needed training system upgrades. In addition, we are annually faced with the need to implement training for unfunded mandates—i.e., Safe Work Practices, security mandates, and LockOut/TagOut (LO/TO) training—that drain our already limited staff resources. Although given no extra funding to cover the required new training, we are also not allowed to temporarily drop any of our standing commitments in order to develop and deliver the new training. Nor does the G&A funding for training cover the EDS upgrades needed to meet the ever increasing demands of managers and training customers for system improvements.

Concerns have also been raised about the need for more timely involvement of training staff in both planning the Lab's response to major initiatives that require Labwide training and reviewing new or revised LIRs whose implementation requires new or added training.

Finally, maintaining quality OJT programs remains a concern. While new Management Walk-Around Cards for OJT are now available on the Web, they must be used to ensure excellent one-on-one training activities. We are also concerned that training evaluation has been put on the back burner because we have been unable to expend either the time or resources needed to track the true effects of training on Lab operations.

Division Assessment of the Training Office. HR Division assigned the Training Office three success indicators: (1) Customers view training as a coherent program and know the availability of training and training services; DOE views the Laboratory Training Program as coordinated; and through training reports, Laboratory managers have an overall picture of training progress in significant programs that they want to review. (2) Training is standardized, and a graded and systematic approach to training is implemented; training audits in major facilities document a

systematic approach to training. (3) Customers utilize institutional training tools and receive training and training reports just in time, which reduces training costs. The Training Office was successful in meeting these expectations.

Summary

Last year, the president of ASTD commented in *Training & Development* magazine that although the billions spent by employers on formal training in the United States seems like a substantial amount, "it is paltry compared to the need so many companies express for a workforce that can compete on the strength of its brainpower."

The Laboratory has many similarities with the companies summarized in the ASTD's 1998 Comparative Data Report:

- Through the use of advanced technology, training is becoming more centrally organized (in the areas of planning and curriculum management, design and development, delivery, and administrative support) but continues to be implemented in a distributed manner.
- Integrating training with corporate business objectives is a primary focus.
- More customers want rapid development and delivery of just-in-time, on-demand training that is delivered to the workplace.
- Emphasis is shifting from training (acquiring skills for a current need) to learning (developing integrated skills and behavior that can be applied within a broad context to meet future needs).

Industry data continue to show that high-tech organizations tend to invest heavily in training. The military, commercial nuclear power plants, and DOE facilities spend more on training than the norm indicated in surveys by the ASTD, International Society of Performance Improvement, and US Office of Technology. However, training expenditures at the Laboratory do not seem out of line with any of the benchmarking data for high-tech companies or government agencies. They are also in line with training expenditures at other DOE sites. Considering the cost of doing business in the highly regulated DOE and nuclear environment with its mandated training requirements, Laboratory training expenditures for the year seem reasonable. Training dollars were spent in areas in which they will have the most impact; for example, in continuing support of Safe Work Practices, upgrading security training, and rolling out the Management and Leadership Institutes.

The feedback from training surveys and other evaluations continues to show that Lab training is viewed positively but that improvements are in order. Some improvements have already been made. In terms of ongoing and future improvements, the training assessment data reported in this section give the Training Office and its Labwide training partners a solid basis for defining both strategic and tactical goals for Laboratory training. These goals are discussed in the next two sections of this plan.

IV. STRATEGIC GOALS

Peter Senge, with MIT's Center for Organizational Learning, believes that progressive organizations champion organizational learning in which everyone is responsible for learning. Such broad-based responsibility is needed for the organization to remain competitive and for its workers to maintain personal/professional growth. DOE, UC, and the Laboratory similarly emphasize individual development. The soon to-be-issued additional DOE Order 350.1 will encompass training and development as well as development plans. UC has a requirement for development plans as part of its Performance Management assessment measures. And the Laboratory has put significant effort into preparing both managers and employees to write development plans.

Paralleling this emphasis on organizational learning is an emerging interest in knowledge management and intellectual capital so that companies can more effectively leverage workers' knowledge and learning. With the escalating rate of workplace change, organizations must invest in learning if workers are to stay productive, learn new skills and behaviors as well as new ways of thinking and operating, and do more complex and subtle tasks that involve problem solving and critical thinking.

The Laboratory Training Program is achieving a long-overdue integration of training activities with larger corporate goals. As the Training Office has noted, "We're moving from a wide comprehensive curriculum of programs to fewer programs that are strategically designed and delivered and that have an emphasis on cost-benefit analysis and return on investment." This move is reflected in the Laboratory Training Program's three strategic goals.

1. Improve training accountability

A 1999 GAO report strongly criticized the lack of accuracy in DOE's information on training activities and expenditures at sites unable to account for all training dollars spent. LANL has a decentralized training organization and institutional systems in place that do not track training programs at the level of detail required by DOE Order 350.1. Although we can report on some aspects of Labwide training, nuclear facility training, and tuition reimbursement, line managers also spend significant amounts on training that our enterprise systems do not track; thus we can make only best estimates on a significant part of the Lab's training expenditures. Because of the new requirements in DOE Order 350.1, LANL must become more accountable for training activities and expenditures.

David Klaus, DOE Director of Management and Administration, is driving this new emphasis on accountability. At the Training Development Management Council (February 2, 2000) in Washington, DC, Klaus delivered the message once again that if we can not demonstrate and defend a sound training program, we will be a potential target, much like contractor travel, for an arbitrary cut of 50% of our training budget. He interprets "soundness" as being able to account for all training dollars spent and having performance measures that gauge training efficiency and effectiveness. It is anticipated that DOE Order 350.1, which formalizes training development and

financial reporting requirements, will be issued in spring 2000. Because of these new requirements, LANL will be driven to become more accountable by tracking training expenditures more precisely using the DOE cost model, participating in extensive training performance metrics, and implementing the DOE 1070 evaluation standard. At the January DOE-AL Partnering meeting with its contractor sites, participants discussed the need for phased, site-specific implementation plans that meet the spirit and intent of Order 350.1.

2. Focus training directly on Laboratory business operations.

For the Lab to remain competitive requires proactive education and training initiatives that emphasize transferring information that is related to business objectives and that workers can see as both useful and immediately useable. More programs must be made available like the one sponsored by CIC and HR for earning master's degrees in nine engineering and computer science fields through Stanford University's Center for Professional Development. Lab training professionals must also continue to address critical work processes and issues, such as they did this past year in support of the Lab's Safe Work Practices and LockOut/TagOut initiatives as well as the Lab's new badging system for facility access. Web-based security refresher training combined with immediate on-line credit for completed training will help maintain worker authorization and facility access in the most timely manner possible.

For training to be a strategic business asset, the Training Program must continue to tighten the "relationships" between Labwide and facility- or site-specific training organizations. Such ties exist through the work of training teams like the FTMC and DTGs and through the services of distributed training professionals provided by the Training Office and ESH-13. The flexibility to move training staff from institutional training to the field or to address institutional initiatives should increase as low-risk, knowledge-based training previously offered in the classroom is changed to Web-based and self-study formats.

For training to be effective, instructors must integrate it with job tasks, thus making training an integral part of business or mission-critical solutions. The program's emphasis on job- and facility-specific training must include an emphasis on more formalized OJT programs. The standards for the delivery of OJT vary among both Lab organizations and OJT trainers. Worker authorization is an important component of Lab business operations, and OJT that supports authorization must become more formalized. For that to happen, formalizing OJT when formality is needed must be a management priority.

3. Evaluate training more thoroughly.

Gone are the days when we just count "instances" of training or trainee "smiley" sheets to determine if training is worthwhile. The true test of training's value should be made at the work site: Does training change job performance? Are the skills learned in training being used and making a difference?

The foundation for a solid training evaluation effort was laid this past year when the Training Office tracked Web usage, such as "hits" on the Virtual Training Center and requests for on-line training reports, to assess the usefulness of institutional training services. Now the office must

evaluate these usage statistics. We must also check to see if we are providing a quality, continuously focused Laboratory Training Program that meets the needs of the institution, meets more restrictive DOE requirements, and justifies training expenditures in a more business-results manner. Measuring training effectiveness is vital to aligning training with Laboratory operations.

The goals for evaluating training in FY 2000 are to

- continue to base training program and course changes on end-of-course evaluations and other feedback,
- provide regular training reports to management to retain the 90% completion rate for critical training programs,
- establish and evaluate the use of EDS for worker authorization, ensuring that workers have the knowledge and skills they need on the job,
- provide guidance cards and supporting observational tools so that managers can collect data to assess whether workers can perform trained tasks months after instruction,
- assess OJT in our most critical facilities and divisions and address identified weaknesses, and
- implement a process to capture the effectiveness of training.

Meeting these evaluation goals will help us determine if training is improving job performance and making an organizational difference. Assessing training effectiveness will also help us define and analyze the Lab's return on its training investment. We need to respond to the new Chapter 10 in DOE's Order 350.1, which deals with capturing the costs of all training, education, and development plans, including our success in cost-sharing efforts related to training. Compliance with this order will require major changes in the Laboratory's tracking and business systems as well as more efficient use of training resources.

4. Exploit Web-based and advanced learning technology.

In these times of rapid change, the knowledge, skills, and abilities of its workers constitute the Lab's competitive advantage. Ongoing worker learning is vital to maintaining that advantage. The Laboratory Training Program must continue to focus on developing immediately needed learning, for both worker qualification and development, while furthering organizational learning and knowledge management. The Training Office will continue to provide resources for utilizing advanced training technologies and for enhancing the Virtual Training Center, which offers a variety of learning pathways and opportunities for leveraging individual knowledge to the whole organization.

Last year, the office successfully consolidated all Lab training information and put it on the Web. The Virtual Training Center provides easy access to course information, on-line registration or Web-delivery links, individual and organization training reports and plans, and a wide variety of other information such as current training rosters, training policies, and classroom locations. It soon will provide Lab customers with one-stop shopping for training that is organized by learning content rather than by delivery organization. Already, however, it is changing the way training information is accessed. On the first anniversary of the Virtual Training Center, we tracked more than simple "hits" on the site. This past year, more than 1,800 voted for National Technology University courses, 3,500 registered on-line for classroom courses, and 27,500

requested on-line credit for Web-delivered courses through the on-line center. We will continue to respond to new training needs as efficiently as we developed the required Technical Surveillance Countermeasures training: in a very short time, 12,500 workers completed this course on-line.

A long-term goal of Laboratory training managers is to exploit advanced computer technology to deliver cost-effective, just-in-time training at the employee's work site. Low-risk, knowledge-based courses are being moved to the Lab's Intranet through the use of authoring software for Web training. The annual benchmarking survey reported that the use of advanced technology in training delivery increased 50% in 1997, but its overall use was still low. The figures for 1998 projected an 8.5% estimated use of such technology between 1997 to 2000, with organizations expecting to increase technology use another 13%. LANL already delivers 20% of its training using advanced technology.

Additionally, LANL training specialists and video engineers are working with innovative video-on-the-Web software developers to move instructor-led and video self-paced training to the desktop. A T&D alliance with Motorola produced a just-in-time learning (JITL) CD-ROM that supported the Lab's new performance appraisal system. As an alternative to traditional classroom training, JITL CD-ROMs can become a valuable tool for technical training, too.

The Web's virtual learning environment offers many advantages: less time away from the job for trainees, no travel costs for training, a familiar training interface, ease of use, immediate training feedback, and the ability to access the most current training information. This new training environment will support worker authorization and be an arena for continual personal and organizational learning.

Other new technologies—like satellite-based distance learning and video-conferencing—will also make training more convenient and less costly. These real-time interactive systems, available at an increasing number of locations at the Laboratory, provide time-sensitive information and data through virtual face-to-face communication. Such systems will allow Lab employees to take advantage of learning opportunities available from facilities throughout the DOE complex, remote training vendors, and distant universities.

Secretary Richardson's recent memo on effectively managing training resources has reenergized the DOE's Technology Supported Learning (TSL) initiative. Because of the Training Program's extensive experience with distance learning, our staff has been asked to participate in finding less costly alternatives to traditional classroom training and travel for training.

Summary

The next three to five years are very important for the Laboratory Training Program, because learning is crucial if the Laboratory is to remain competitive through qualified employees who are authorized to work. The "intellectual capital" of the Laboratory is its major asset—is the basis of its competitive edge—and the Training Program must focus on enhancing the performance of this intellectual capital. Our key strategic goal is for training to become a business asset at the Laboratory.

Developing better evaluation techniques is another strategic goal. Such techniques will help us identify the true breadth of our facility OJT, the impact of all training, and the value training adds to programmatic efforts. Part of measuring the impact of training is measuring its cost-effectiveness. To make such a measurement, however, we first need to better capture the costs of training, including those of travel for training and of training sponsored by individual groups and divisions at the Lab.

Offering training through a virtual campus on the Web is commensurate with the innovative, high-tech R&D organization that LANL is acknowledged to be. Exploiting advanced training technology should also produce the long-range cost savings expected by DOE. Using Web technology to make training more accessible and available in the workplace may also lead to wider endorsement of training.

This past year training has been important to Lab managers and employees alike not only in terms of meeting facility-specific worker authorization requirements but also in terms of meeting institutional mandates such as safe work practices and enhanced security awareness. In addition, the introduction of the Workforce Planning Website has made managers keenly aware of the need for "succession" planning and worker development as a higher percentage of the workforce ages into retirement. The Training Program is moving from being viewed as a support organization that offers training products of variable usefulness to a strategic business partner in carrying out the Laboratory's mission. Our goal in FY 2000 is to further this transition by using advanced technologies to deliver more training that is focused on business operations directly to the workplace.

V. TACTICAL GOALS FOR LABORATORY TRAINING

The intent of the Laboratory Training Program is to deliver the right training at the right time and to the right people in order to get work done. In addition, workforce development initiatives address the need to ensure future workforce employability and contributions to the Lab's strategic goals. In *The Balanced Scorecard*, Kaplan and Norton view both learning and innovation as critical elements in facilitating continuous improvement, promoting self-renewal, and maintaining purpose and relevance in organizations. The tactical goals presented in this section are a means of achieving the strategic training goals discussed in Sec. IV and will guide the delivery of training services and products in the coming year. Key themes are to improve data collection for training, examine measures of training effectiveness, and partner with the DOE to evaluate the systematic approach to training.

Our tactical goals for training are listed in the following tables in the same order that our training accomplishments were given in Sec. II. We begin with the tactical goals of the Training Office as they relate to the Training Program's strategic goals. Then we move on to the tactical goals of the varied Lab organizations that offer workforce development, safety and security, and division- or facility-specific training.

Strategic Goal	FY 2000 Tactical Goals for the Training Office
1. Improve training accountability.	• Continue to refine the Laboratory training structure, recommend changes to better address recent DOE training management issues, and respond more efficiently to training needs. • Participate in the DOE Training Cross-Cutting Forum to eliminate the duplication of effort in the development of training courses. • Strengthen the completeness of EDS data by integrating more local training databases into this corporate training records system to be more accountable for the total instances of training. • Promote institutional systems changes and the integration of decentralized training services data to address recent DOE training management oversight requirements. • Continue to participate in benchmarking activities to benchmark training costs against industry standards to be in line with federal agencies and the private sector. • Partner with Lab organizations, regional educational groups, and other DOE sites to maximize training resources, leverage training expertise, and conduct training evaluation according to the DOE 1070 standard to document a cost effective training program without duplication of effort. • Refine attendance-reporting capabilities for Lab-wide stand-down training events.

Strategic Goal	FY 2000 Tactical Goals for the Training Office
2. Focus training on Laboratory business operations.	• Provide the structure for documenting worker authorization and new super training plans to allow users to fold institutional training plans into organization or facility-specific plans. The benefit is that their sponsor will maintain institutional course requirements and their equivalencies. Managers and workers will be able to see individuals' qualifications for an activity based on one super training plan. • Manage the remaining milestones of the Laboratory's DOE 5480.20A commitments to worker training and qualification at all nuclear facilities and facilitate the approval of new training at the facilities. • Continue to work toward having all workers complete, and line managers verify Training Questionnaires. • Issue training guidance documents in support of the Laboratory's Integrated Safety Management program that define qualification/certification, quality processes, and methodology.
3. Evaluate training more thoroughly.	• Collect data to track customer satisfaction with training and to capture information on Laboratory training activities and the completion of qualification requirements. • Develop measures for evaluating training effectiveness at the work site and training's impact on Laboratory business. • Estimate cost savings from new initiatives such as Web-based delivery of training and inter-laboratory sharing of training.
4. Exploit Web-based and advanced learning technology.	• Develop a searchable on-line catalog of all Laboratory training and a linked on-line voting mechanism that allows employees to communicate their training needs to sponsoring training organizations. • Expand our Web-delivery system to allow workers at all DOE sites to take appropriate LANL-sponsored Web-based training. • Double the number of Web-delivered courses. • Use new Web tracking software to (1) track employees' progress in training, (2) identify learner problems and successes in training to improve training programs, (3) deliver and grade quizzes and tests, (4) compare training reports and assessment results with regulatory standards to inform managers of workers' compliance status, and (5) maintain Web-based training records. • Exploit educational delivery technologies (e.g., the Internet, Labnet Channel 10, interactive satellite downlinks, two-way video-conferencing, microwave instructional television, CD-ROMs, and computer-based training) to deliver more just-in-time training to the customer.

Group	FY 2000 Tactical Goals for Workforce Development Training
BUS	• Identify new training needs of BUS workers and develop a Web training resource page for workers to locate and utilize business-related training.
CIC-6	• Provide the latest in ASCI training to prepare technical staff for success in a Teraflop-computing environment. • Enhance the Supercomputing Challenge program. • Enhance Web-authoring curriculum by developing additional advanced training. • Continue to adapt to the growing need for technical computer training. • Support the technical computing side of Information Security Training.
HR	• Continue to offer diverse HR training: New-Hire Orientation, Technical Recruiters training, Workforce Development Tools training, and courses focused on improving staff relations (e.g., sexual harassment presentations, Essentials of Supervision and Labor Relations training.) • Provide additional tools for major HR projects to guide managers and workers in benefits decision-making and implementation of HR systems changes. • Expand product portfolio in the Professional Success Series (PSS) of the Leadership Centers and Learning@lanl for Laboratory workers. • Develop Organizational Development (OD) consulting for the Laboratory to provide expertise and coordinate with other OD efforts for organizational interventions. • Introduce Workforce Planning (WFP) and Succession Planning (SP) processes and tools into customer organizations through the continued implementation of the Leadership Centers and Learning @lanl. • Provide ongoing development opportunities for all employees/contractors at the Laboratory through Learning@lanl to improve internal mobility and LANL's ability to meet internal professional development needs. • Recommend behaviors for inclusion into the Performance Management System.

Group	FY 2000 Tactical Goals for Safety and Security Training
ESH	• Increase the number of test and quiz questions in the question bank to ensure the bank's validity. • Work with the New Mexico Game and Fish Department and ESH-20 to offer a safety awareness class on bears, mountain lions, and coyotes. • Modify self-study quizzes for on-line use.

Group	FY 2000 Tactical Goals for Safety and Security Training
	• Collaborate as needed to evaluate formal tests. • Integrate electronic training technologies into live presentations. • Train ESH-13 personnel in new/emerging training technologies to improve delivery techniques. • Continue to revise over 60 courses in response to course evaluations, including redesigning and implementing LockOut/TagOut simulation equipment. • Deploy health and safety trainers as requested by Laboratory customers and update our on-line registration system. • Improve the interface between facility-specific training programs and centralized ES&H training. • Establish on-line practical exams for recertifying industrial hygienists and safety professionals.
S	• Complete revisions to on-line and classroom courses requiring annual or periodic updating for Nuclear Material Handler, Nuclear Material Custodian Refresher, Classified Matter Holdings (Classified Document Custodian), Classified Parts Custodian Training, Key Custodian Training, Access Area Custodian Training, and Access Area User. • Update the cognitive course content of Management of Emergencies at LANL, make the course available on the Web, and develop a drill for it to provide hands-on practice for Emergency Operations Center personnel responding during an actual emergency. • Develop a new Emergency Technical Support Center course.
JCNNM	• Continue development and implementation of training program procedures. • Develop and implement Competent Person program and training plans. • Increase responsiveness of training to training needs through use of CBT, self-study, union training, and the “fast-track” initial training program for craft workers.
PTLA	• Train 60 new protective force officers and provide refresher training and qualification for 330 incumbent protective force officers. • Continue to reduce injuries to officers during training. • Improve the quality and documentation of zone-specific OJT.

Division or Facility	FY 2000 Tactical Goals for Division- and Facility-Specific Training
E-ET (TWCP)	• Increase the number of job functions that TWCP workers are qualified to perform. • Monitor and support worker qualifications in organizations outside the TWCP that provide key services, products, and information.
FWO (SWO & RLW)	• Implement a formal OJT training program for Area L, convert the new training database to a Web-based application to provide on-line management information, and convert "required" training to more efficient computer-based training using Toolbook technology. • Complete RLW training program improvements. • Use EDS to track worker qualification automatically.
ESA-TSE	• Develop a consistent approach among all three tritium facilities for building training plans, documenting TSE qualifications, documenting training development, and maintaining worker authorization. • Develop training materials for mechanical technicians, electrical mechanical technicians, and real-time mass spectrometer and general glove box workers. • Prepare for the startup of the Neutron Tube Target Loading project at TA-16.
LACEF	• Continue to pilot the generation and use of super training plans in EDS. • Implement the new FMH Certification and the modifications to SNM Access Training. • Implement "Qual Cards" for line management to authorize work.
LANSCE	• Develop and implement additional training tools for foreign visitors, including a training introduction in Japanese and quick reference cards in at least two languages. • Integrate a Web-based LANSCE safe work practices system with the current OJT program.
NMT (TA-55 & CMR)	• Implement NMT Division training procedures. • Implement behavioral safety training throughout the division.
MST	• Develop operation-specific training for the Beryllium Facility. • Integrate MST's Labwide training plans with operational-specific plans to develop new plans based on HCPs and streamline worker authorization for MST managers.

Summary

A variety of training assessments—needs analyses, input from Laboratory leaders, projected requirements, benchmarking data, customer feedback, and training evaluations—have suggested directions for FY 2000 training. Strategic training goals have helped organizations that offer both Labwide and facility-specific training to identify initiatives that will support Laboratory operations, deliver training more efficiently, and develop a qualified workforce.

The FY 2000 tactical goals outlined in this section will help execute key organizational strategies, decisions, and change; teach new technical skills and techniques; implement new polices, regulations, standards, and procedures; and authorize workers through qualification programs that ensure that workers can competently execute their job assignments. The involvement of subject matter experts in such training will ensure that training content is appropriate, correct, and targeted to the right audience. The continuing efforts of training managers will focus on delivering more and better Web-based training.

Support for training by the Lab's senior management reinforces the commonly held belief that a well-trained worker will be a productive worker who safely and effectively discharges work responsibilities. Managers recognize that learning skills are required in order to respond flexibly and quickly to technical and organizational change, to make continuous improvements in quality and efficiency, and to develop new technologies, products, and services. As Ken Blanchard has observed, training has a history of promoting knowledge and positive work attitudes but now the challenge is to tie learning to changes in behavior, on-the-job performance, and bottom-line operational results. The Training Office will continue to gear Lab training toward meeting and improving the Laboratory operations.

VI. CONCLUSIONS

The Laboratory training community achieved much during FY 1999. From 1,200 organizations in the benchmarking survey, the Laboratory was named an ASTD Training Investment Leader in the field of training for its record of training activities and use of advanced learning technologies in key training and development activities. ASTD concluded that Training Investment Leaders reflect the level of investments that's needed for organizations to put training and employee development at the core of their work to boost performance and profits. The Training Investment Leaders also are showing that learning is an integral and essential part of the day-to-day business of organizations—not just to keep up but to serve customers better, to work smarter, and to grow. It partnered with other Lab organizations to provide the training needed to meet new institutional safety and security mandates. It facilitated and tracked 34,229 training-related events that were completed by Laboratory workers during the year.

The Training Office continues to partner with organizations across the Laboratory to integrate training activities with larger institutional objectives and to deliver training products relevant to Lab business operations and worker development. Results of our efforts to reengineer training include providing on-demand, just-in-time, and just-enough training resources. We will continue to focus on developing integrated, performance-centered training platforms and on supporting mandated training initiatives. We are also striving to evaluate Lab training system changes to ensure that training is focused on projects that add value in terms of furthering programmatic goals at the Laboratory.

The Virtual Training Center, the sixth most-accessed Web site on the LANL Intranet, continues to be enhanced in response to a variety of internal assessments. In line with training trends outside the Laboratory, we are striving to move more training from the classroom to the desktop, making both training opportunities and records more widely accessible on the Web. Web-based training offers the advantages of wider access, easier updating, and a common user interface for training offered throughout the Laboratory. Continued enhancements to the EDS database and the Virtual Training Center will make more training data and reports available in a wider variety of formats to both managers and employees, helping them pinpoint who needs what training when. Recent enhancements involving the use of token cards permit workers who are denied facility access because of a training deficiency to complete the needed training on-line, record appropriate course credit, and be granted facility access within an hour.

Finally, while orchestrating changes toward more effective, customer-focused, technologically advanced, and institutionally aligned training, all partners in the Laboratory Training Program are striving to make more efficient use of limited resources. Like many training organizations within the DOE complex and nationwide, we face the challenges of achieving more with less and realizing additional cost savings through cross-sharing of training among DOE sites and use of training technology. Our success in all of these endeavors will be measured a year from now when we reassess the Training Program’s accomplishments and savings and track additional training data for DOE oversight and activities.

Training Program activities in FY 2000 will continue to (1) meet LANL business needs and address external drivers, (2) demonstrate organizational value that leads to managers championing training, (3) fit in with the Lab's decentralized delivery but centralized coordination of training, and (4) demonstrate measurable results and customer satisfaction.

In addition, other changes will evolve in the training program, as DOE's training oversight program intensifies.